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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/579,345	05/25/2000	Terry L. Gilton	6047-55230	7950

7590 03/13/2003  
Klarquist Sparkman Campbell  
Leigh & Winston LLP  
One World Trade Center 1600  
121 SW Salmon Street  
Portland, OR 97204

EXAMINER

FOURSON III, GEORGE R

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

09/579,345

Applicant(s)

GILTON ET AL.

Examiner

George Fourson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 February 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

The restriction requirement in the office action mailed 12/20/00 is withdrawn.

Claims 21 and 22 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 20 requires the gas to be dissolved in the liquid in recitation of "transported through the liquid". Claim 22 does not require a particular thickness of film through use of "thin" which is subjective as discussed below.

Claims 2,23,7,9,10,12,13,15-19,22 and 30-37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 2 and 23, it appears that "consisting essentially of" should be replaced by -- consisting of -- because the term is seen to synonymous with "comprising" (MPEP 2111.03). If applicant intends the "wafer" of claim 6, for example, to be the "semiconductor wafer" of the preamble then -- the -- should replace "a" before "wafer" in claim 6, line 4, for example. In claim 7, it appears that "inert in the liquid solvent" should be replaced by -- inert with respect to -- the liquid solvent. In claim 9, -- further- -- should be inserted before "including". In claim 10, the claim should read "the dew point of the liquid solvent in the reactant gas mixture during the forming step" unless another step is intended because dew point of a component of a mixture depends on concentration and temperature of the mixture. In claim 12, -- further- -- should be inserted before "including". In claim 13, -- further- -- should be inserted before "including". In claim 15, -- further- -- should be inserted before "including". The term "thin" in claims 16,22,30-32,37 and 38 is a relative term which renders the claim indefinite. The term "thin" is not defined by the claim, the

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specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. If applicant intends a particular thickness it must be clearly recited. In claim 17, the claim should read "the dew point of the liquid solvent in the reactant gas mixture during the forming step" unless another step is intended because dew point of a component of a mixture depends on concentration and temperature of the mixture. In claim 30 it appears that - - the - - should precede "reactant mixture droplets" or the claim should read "mist of droplets of the reaction mixture".

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3,6,7,9,11-16,18,20-27,30,31,32,34,37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergman et al (U.S. Patent 6,267,125).

Bergman discloses spraying deionized water or a mixture of deionized water and ozone (col.6, lines 12-14 and 51-60) to form a liquid layer on a semiconductor substrate comprising a photoresist layer, controlling the thickness of the film by spinning or other methods and supplying ozone to the chamber to diffuse ozone through the liquid layer and react with the photoresist for removal of the photoresist. The reference discloses introduction of the mixture as a steam/ozone mixture with or without introduction of ozone into the chamber. See column 5, line 42 – column 7, line 10.

Claims 4,5,8,10,17,19,28,29,33,35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergman et al as applied to claims 1-3,6,7,9,11-16,18,20-27,30,31,32,34,37 and 38 above, and further in view of the following comments.

The choice of a particular thickness of liquid film would have been a matter of routine optimization to achieve a desired etch/cleaning rate in view of the disclosure at column 5, line 66 – column 6, line 31). MPEP 2144.05.

In view of the disclosure that the deionized water initiates the cleaning/removal reaction and that the water functions to control diffusion of ozone to the wafer surface (col.5, lines 25-40) it would have been within the scope of one of ordinary skill in the art to supply ozone for an amount of time before or after introduction of the water that would be of insufficient duration to have an appreciable effect on the process. The effects of such a step are contained in or follow from the teachings of the reference.

Bergman orients the wafers horizontally as opposed to vertically. In view of the disclosure that the wafers are supported such that the liquid can be sprayed on the wafer, it would have been within the scope of one of ordinary skill in the art to vertically orient the wafers because that orientation would allow the contact of the wafers and the liquid.

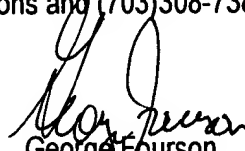
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Choice of a temperature for the liquid as recited in claim 28 would have been a matter of routine optimization in view of the disclosure of the reference related to the effect of heating of the liquid and particularly the effects on ozone solubility and reaction rate with the photoresist material. The wafer would have a temperature of 25°C at the beginning of the process which temperature would have been a matter of routine optimization to achieve a desired initial etch rate. With respect to claims 10 and 17, prior cooling of the wafer prior to introduction would have been a matter of routine optimization to achieve a desired initial etch rate.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956. See MPEP 203.08.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner George Fourson whose telephone number is (703) 308-2544. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794. The fax number for this group is (703)308-7722 (or extensions 7724, 3431 or 3432) for regular communications and (703)308-7382 for after final communications.

  
George Fourson  
Primary Examiner  
Art Unit 2823

GFourson  
February 10, 2003